



SLOVENSKI STANDARD
SIST EN 14617-10:2012

01-julij-2012

Nadomešča:
SIST EN 14617-10:2005

**Aglomeriran kamen - Preskusne metode - 10. del: Ugotavljanje kemijske
odpornosti**

Agglomerated stone - Test methods - Part 10: Determination of chemical resistance

Künstlich hergestellter Stein - Prüfverfahren - Teil 10: Bestimmung der chemischen
Beständigkeit

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Pierre agglomérée - Méthodes d'essai - Partie 10: Détermination de la résistance
chimique

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Ta slovenski standard je istoveten z: EN 14617-10:2012

ICS:

91.100.15 Mineralni materiali in izdelki Mineral materials and
products

SIST EN 14617-10:2012

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 14617-10

April 2012

ICS 91.100.15

Supersedes EN 14617-10:2005

English Version

Agglomerated stone - Test methods - Part 10: Determination of chemical resistance

Pierre agglomérée - Méthodes d'essai - Partie 10:
Détermination de la résistance chimique

Künstlich hergestellter Stein - Prüfverfahren - Teil 10:
Bestimmung der chemischen Beständigkeit

This European Standard was approved by CEN on 9 March 2012.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 14617-10:2012) has been prepared by Technical Committee CEN/TC 246 "Natural stones", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2012, and conflicting national standards shall be withdrawn at the latest by October 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14617-10:2005.

4.3, 4.4, 4.5, A.3 and A.4 have been modified since the last edition of this European Standard.

This European Standard is one of a series of standards for test methods for agglomerated stones which includes the following:

EN 14617-1, *Agglomerated stone — Test methods — Part 1: Determination of apparent density and water absorption*

EN 14617-2, *Agglomerated stone — Test methods — Part 2: Determination of flexural strength (bending)*

EN 14617-4, *Agglomerated stone — Test methods — Part 4: Determination of the abrasion resistance*

EN 14617-5, *Agglomerated stone — Test methods — Part 5: Determination of freeze and thaw resistance*

EN 14617-6, *Agglomerated stone — Test methods — Part 6: Determination of thermal shock resistance*

EN 14617-8, *Agglomerated stone — Test methods — Part 8: Determination of resistance to fixing (dowel hole)*

EN 14617-9, *Agglomerated stone — Test methods — Part 9: Determination of impact resistance*

EN 14617-10, *Agglomerated stone — Test methods — Part 10: Determination of chemical resistance*

EN 14617-11, *Agglomerated stone — Test methods — Part 11: Determination of linear thermal expansion coefficient*

EN 14617-12, *Agglomerated stone — Test methods — Part 12: Determination of dimensional stability*

EN 14617-13, *Agglomerated stone — Test methods — Part 13: Determination of electrical resistivity*

EN 14617-15, *Agglomerated stone — Test methods — Part 15: Determination of compressive strength*

EN 14617-16, *Agglomerated stone — Test methods — Part 16: Determination of dimensions, geometric characteristics and surface quality of modular tiles*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 14617-10:2012 (E)

1 Scope

This European Standard specifies a method for determining the chemical resistance and the resistance to stains of agglomerated stones (see EN 14618) with a polished surface after a prolonged contact with chemical materials.

NOTE It is to be remembered that agglomerated stones containing calcium carbonate aggregates are sensitive to any acid attack.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

3 Principle

Resistance to a chemical attack is the characteristic which defines the behaviour of a floor/wall covering material in contact with chemically aggressive agents potentially able to react with the surface itself, and thereby either corrode it, penetrate it permanently or alter the visible aspect in some manner.

The deteriorating action of the aggressive chemical can generate two different effects:

- a real chemical action, according to which the alteration of the surface is due to the chemical reaction between the aggressive agent and some constituents of the surface itself;
- a physical absorbing action, according to which the aggressive agent is able to penetrate the surface so that the removal is either extremely difficult or impossible.

Both these actions can involve a modification of the visible appearance of the surface of the chemically attacked material, but only in the first case can the damage also introduce a modification in the physical and mechanical properties of the material itself.

4 Determination of the chemical resistance

4.1 Chemical reagents

4.1.1 Water solution containing hydrochloric acid solution, 50 % (V/V), prepared from N hydrochloric acid solution.

4.1.2 Sodium hydroxide in a 50 % (V/V) water solution, prepared from a normal water sodium hydroxide non-carbonated solution.

4.2 Apparatus

Glossmeter, able to measure with an accuracy and precision of 10 %, the brightness degree of the surface.

The glossmeter shall measure the reflection of a light ray incident on a surface. The reflection degree is given by the amount of light specularly reflected in a point of the surface in relationship to the amount of light

reflected by the standard glass plate. A light source representing average daylight shall be used, such as the source CIE¹ D 65, with the lighting intensity allowed by the glossmeter calibration.

The glossmeter shall be equipped with at least two optical systems placed at 60° and 20° angles. This allows for an efficient measurement of the different reflection directions: the 60° angle covers a range of reflection degrees from low to high, while the 20° angle lends greater accuracy to the measurement of the higher reflection directions (see Annex A).

4.3 Preparation of the specimens

For each type of material to be tested four samples shall be prepared with a polished surface² of at least 300 mm × 300 mm onto which a containing ring (at least 100 mm diameter) is glued. The ring is made of chemically resistant material such as silicone.

The surface to be measured shall be flat in order to permit the positioning of the instrument sensor in contact with the material to be tested. Before testing, the surface shall be cleaned of any possible wax, other finishes or treatment layers using ketone or another appropriate solvent.

4.4 Test procedure

The procedure consists of positioning the instrument sensor in contact with the surface to be measured, and of reading the number reported on the display which defines the reflection degree as a reference value of the examined surface.

The test shall be carried out at an ambient temperature of $(23 \pm 5)^\circ\text{C}$.

On each of the four specimens, it is necessary to carry out the reflection measurement on at least five different points, and to then calculate the average value (M_1) of each specimen.

On two specimens placed horizontally within the ring, pour 10 ml to 15 ml of hydrochloric acid solution (4.1.1), avoiding any possible overflowing.

Repeat this operation on the other two specimens using the sodium hydroxide solution (4.1.2).

Keep the specimens, protected with a polyethylene film, on a table for all the time requested for the test.

After $1\text{ h} \pm 5\text{ min}$ draw out one specimen containing hydrochloric acid and one containing sodium hydroxide respectively; wash them carefully with water and remove the ring. Finally, dry them with soft cellulose paper. After $8\text{ h} \pm 30\text{ min}$ draw out the two other specimens and perform the same washing and drying procedure.

Repeat the reflection measurement on at least in 5 points on each of the four specimens, and then calculate the average value for each specimen and the standard deviation of the 5 values. The reflection measurements are to be carried out with the glossmeter under an incident light positioned at 60°.

4.5 Expression of the results

a) The effects of the chemical attack are expressed as the loss of the reference reflection value.

This loss is calculated as a percentage of reflection of the material tested with respect to the reference value.

A class of resistance to acids and alkali shall be attributed as follows:

¹ Commission Internationale de l'Éclairage (Central Bureau, Kagelpasse 27, A-1030 Vienna-AT).

² Obtained by polishing with abrasive grit, grain size F500, according to ISO 8486-2:2007, *Bonded abrasives — Determination and designation of grain size distribution: Part 2: Microgrits F230 to F2000*.

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- C₄: materials, which keep at least 80 % of the reflection reference value after 8 h ± 30 min of acid and basic attack (or if only in one specimen the attack is between 60 % and 80 %);
- C₃: materials, which keep between 60 % and 80 % of the reflection reference value after 8 h ± 30 min of acid and basic attack;
- C₂: materials, which keep between 60 % and 80 % of the reflection reference value after 1 h ± 30 min of acid and basic attack;
- C₁: materials, which keep less than 60 % of the reflection reference values after 1 h ± 30 min of basic and acid attack.

b) The values are calculated on the basis of 5 measurements and the dispersion is declared.

4.6 Test report

The test report shall contain the following information:

- a) unique identification number of the report;
- b) number and year of issue of this European Standard, i.e. EN 14617-10:2012;
- c) name and address of the test laboratory and the address where the test was carried out if different from the test laboratory;
- d) name and address of the client;
- e) it is the responsibility of the client to supply the following information:
 - name of the supplier;
 - name of the person or organization which carried out the sampling;
 - surface finish of the specimens (if relevant to the test);
 - nature of the binders;
- f) date of delivery of the sample or of the specimens;
- g) date when the specimens were prepared (if relevant) and the date of testing;
- h) number of specimens in the sample;
- i) dimensions of the specimens;
- j) water solutions preparation and concentration and chemical agents used;
- k) type of glossmeter used and the kind and intensity of the light source;
- l) reflection directions of the light;
- m) results obtained, using the following table:

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Table 1 — Results

Chemical resistance	Sample N	Reference value	Class
- Hydrochloric acid solution			
- Sodium hydroxide solution			

- n) statement on measurement uncertainty (where appropriate);
- o) all deviations from the standard and their justification;
- p) remarks.

The test report shall contain the signature(s) and role(s) of the person(s) responsible for the testing and the date of issue of the report. It shall also state that the report shall not be partially reproduced without the written consent of the test laboratory.

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